

# Commuting Technologies, City Structure and Urban Inequality: Evidence from Bogotá's TransMilenio

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# This Paper

- Rapidly growing cities can become congested and characterised by inequality
- Does poor transport infrastructure cause poverty and increase inequality?
- In this paper, I study the impact of TransMilenio, a novel Bus Rapid Transit system in Bogotá, Colombia
- Questions:
  1. (Aggregate) Can we quantify the benefits of BRT relative to its cost?
  2. (Distributional) Can BRT raise the income and welfare of a city's poorest citizens and reduce inequality?
    - Reduce commuting times
    - Reduce spatial mismatch between low-skill workers and firms

# TransMilenio

Bus Rapid Transit System (BRT) in Bogotá, Colombia



# TransMilenio

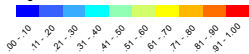
## Bus Rapid Transit System (BRT) in Bogotá, Colombia

- Opened in December 2000, announced just two years prior
- Most used BRT in the world - currently 2.2mn trips/day
- 3 Phases: (i) 2000-2003, (ii) 2005-2006, (iii) 2012-2013
- System of feeder buses serve portals at end of routes at no additional cost
- But has become congested, with usage exceeding planned capacity

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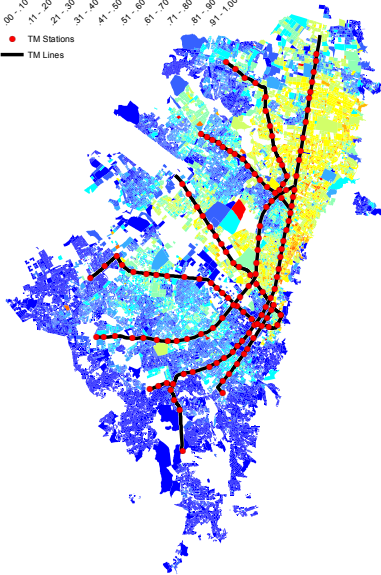
Multiple lines covering much of the city

College Share



● TM Stations

— TM Lines



# Data

- I leverage a rich set of spatial data available before and after TM's construction, across >37,000 city blocks:
  - **Land:** Land and property value, commercial vs residential usage, floor area, building characteristics
  - **Commuting Microdata:** Origin, destination, demographics and trip characteristics
  - **Residential Population:** Population and demographics
  - **Employment, Firm Level:** Complete enumeration of firms, with industry and # workers
  - **Employment, Worker Level:** Income, employment and demographics microdata

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- Use natural experiment to let the data quantify the importance of both forces

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  - Staggered station openings for falsification
  - Historical maps of the city to predict route placement
3. Estimate structural model, and quantify
  - The benefits of TM relative to its cost
  - The gains across worker groups, and the role of spatial mismatch in affecting these gains
  - Counterfactual returns to new line construction

# Preliminary Findings

- Commuting:
  - TM used mostly by low/middle-income individuals
  - Disproportionately reduced commuting times for long trips
- Other outcomes:
  - Land values have increased close to stations, especially in peripheral neighbourhoods
  - Land has reallocated to commercial use near stations
  - Wages grew approx. 7% more for blocks <500m from stations vs those >1km away, greater in peripheral neighbourhoods
- Falsification tests suggest effects are causal
- Results for employment, and quantifying total aggregate and distributional effects forthcoming

# Conclusions

- BRT is an attractive alternative to subways for cities with little public transit infrastructure
- My findings so far suggest a sizeable impact on land and labor markets
- My quantitative results will provide estimates of the
  1. Cost efficiency of BRT
  2. Distributional effects of BRT
  3. Whether spatial mismatch matters in L/MIC cities
- **Remaining Question:** How did Bogotá's land use policy limit the gains from TransMilenio?